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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

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EXAMINER: S. COSTALES

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GROUP ART UNIT: 1714

TITLE: MULTIFUNCTIONAL DISPERSANTS

Wickliffe, Ohio
Dated: February 13, 2006

Mail Stop Non-Fee Amendment
Hon. Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

RESPONSE AND REQUEST FOR RECONSIDERATION

This is in response to the Office Action dated November 18, 2005, to which a response is due by February 18, 2006.

The present invention relates to a multifunctional dispersant which is prepared by heating together a dispersant and 2,5-dimercapto-2,3,4-thiadiazole or a hydrocarbyl-substituted 2,4-dimercapto-1,3,4-thiadiazole and further either a borating agent or an inorganic phosphorus compound (or both). The product is soluble in a hydrocarbon oil, even though the dimercaptothiadiazole material is substantially insoluble at 25 °C. The product imparts multiple aspects of functionality to a lubricant, especially an automatic transmission fluid, in a balanced composition with reduced complexity and variability.

The Examiner was of the opinion that certain of the present claims (1,2,6,7,10-16 and 20) were anticipated by Toukan, US 4,618,438, or that all of the claims were made obvious by Ward, US 6,251,840, in view of Toukan.

The examiner indicated that Toukan discloses a reaction product of 3,5-dimercapto-1,3,4-thiadiazole and other components. (It is believed that the examiner intended the 2,4-dimercapto- isomer.) The present invention is distinct and not anticipated by this reference. Toukan uses a polymeric species of a thiadiazole, rather than

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on February 13, 2006 By: Jesse Recyk

the simple monomeric thiadiazole or monomeric hydrocarbyl-substituted thiadiazole of the present invention. See for instance the abstract, col. 1 line 38, col. 3 line 1, and the examples in Toukan. The polymeric species is specifically pointed out by Toukan as being prepared by the procedure of US 4,107,059, or alternatively as being prepared by an oxidation of the disodium salt with hydrogen peroxide and phosphoric acid (example 2). This is different from the disclosure and claims of the present invention.

It is also noted that the reference claims and prefers the polymer of the 1,2,4 isomer of dimercaptothiadiazole, rather than the polymer of the significantly different 1,3,4 isomer, since a complex with the latter is indicated to be inferior in performance properties (col. 3 line 55). Furthermore, although Toukan teaches that the reactants may include a boron compound, it appears that the only disclosure of such a material is in combination with the (incorrect) 1,2,4-isomer of the (incorrect) polymer – see examples 17(b) and (c).

Accordingly, the present claims are not anticipated by Toukan. Neither are they made obvious. The presently claimed 2,5-dimercapto-1,3,4-thiadiazole or hydrocarbyl-substituted 2,5-dimercapto-1,3,4-thiadiazole is not a polymeric material and it is not obvious to select the monomer on the basis of a disclosure of a polymer. Thus, there is no teaching or motivation based on Toukan to switch to a monomeric material, switch to a different isomer, and then react that twice-different material with a boron compound. There is no reason to believe that the advantages of the present invention would be achieved by doing so.

Turning now to the Ward reference, this document discloses lubricating composition which contain 2,5-dimercapto-1,3,4-thiadiazole or derivatives thereof. One of a dozen or so types of derivatives listed is “k) products from combining an oil soluble dispersant with DMTD.” The lubricant of Ward can also contain boron or phosphorus from the presence of certain other added materials. However, there is no teaching of providing a new composition of matter – a dispersant containing both the moieties of 2,5-dimercapto-1,3,4-thiadiazole and boron or phosphorus, all reacted together. Such a composition provides a lubricant additive which imparts multiple aspects of the required functionality to a lubricant, thus reducing the complexity and variability of the formulation, as well as, in many cases, the treat rate and cost. This is not obvious in consideration of Ward, whether taken alone or in combination with Toukan. Toukan differs in many respects from both Ward and from the present invention. Toukan discloses a polymeric species rather than Ward's monomeric species. Toukan discloses that materials made with (polymers of) Ward's 1,3,4 isomer exhibit inferior properties. And as to boronation, the only disclosure in Toukan is that the wrong isomer and the wrong species can be reacted with a different boron compound from those disclosed by Ward –

namely, boric acid, rather than the (unreacted) borated epoxide or borated dispersant disclosed in Ward (col. 7 lines 11-13). In fact, there is no teaching that Ward's boron compounds are even reactive with his DMTD derivative. With all these differences, it is submitted that there is inadequate motivation to combine Ward with Toukan or thereby arrive at the present invention.

Separate consideration is requested for the subject matter of claim 8. This claim specifies that the borating agent is an inorganic species. This is not disclosed or suggested by Ward. It is therefore submitted that, apart from the above arguments, the subject matter of claim 8 is both novel and unobvious.

Conclusion.

For the foregoing reasons it is submitted that the present claims are novel, unobvious, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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